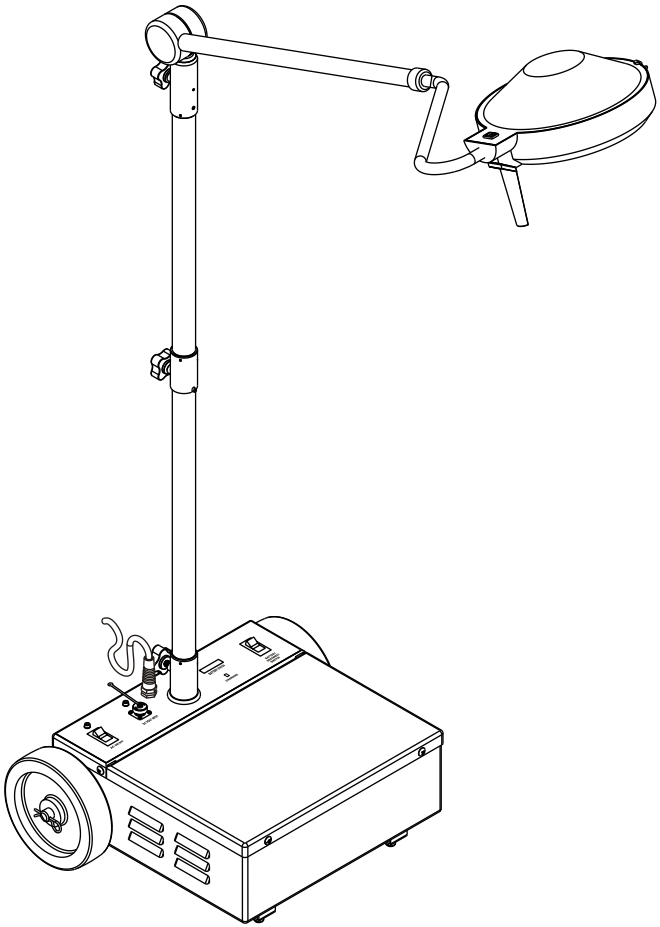
**Operator Manual**

# *FMI-301FB*



FedMedical, Inc.

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This symbol is intended to alert the user to the presence of important operating and maintenence instructions in the literature accompanying this appliance.

If the BATTERY DISCONNECT SWITCH is in the OFF position when external power is applied (AC or 24VDC), the inverter must be reset prior to using the surgical light with the following procedure:

1. Remove the external power source by either turning off the AC switch or disconnecting the 24 Volt Input connector.
2. Turn the Battery Disconnect Switch ON
3. Restore external power

Use caution when disassembling the Spring Arm Assembly from the Lamp head Assembly. They are connected by approximately 3 inches of excess cable.

Never perform maintenance or service on an energized unit. Ensure no external power is applied and the Battery Disconnect Switch is in the OFF position prior to opening the unit

Use caution when replacing the light bulb if the lamp was recently in use as the reflective dish and bulb may be hot.

Do not touch the light bulb with your fingers. Always use a soft cloth or rag to prevent skin oils from getting on the bulb.

Use extreme caution when troubleshooting energized circuits. Dangerous voltages are present which can be life threatening. Never attempt repairs on an energized circuit.

# 1. Indicators and Controls

## A. AC ON/OFF

Provides AC power to the electronics when power cord is plugged in to an AC source. The green LED above the switch will illuminate when AC power is present.

## B. 24 VOLT INPUT

Provides 24VDC to the electronics when supplied by any 24VDC source. The green LED above the input connector will illuminate when 24VDC is present.

## C. AC INPUT

Power cord may be plugged in to any standard AC outlet.

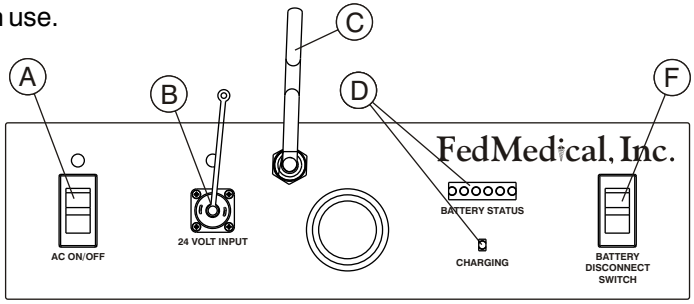
## D. Battery Status & Charging Gauge

The Battery Status is indicated by the 6 LED bar graph. A fully charged battery will light all 6 LEDs. As the charge on the battery drops, the LEDs will extinguish one at a time from right to left until only the Red LED is lit. At this point, the unit should be charged. If the red LED extinguishes, the voltage available is marginal for running the electronics and the unit may stop functioning until external power is available.

When the unit is charging, the Charging LED will light and the Status LEDs will extinguish. When the battery is fully charged, the Charging LED will extinguish and the Status LEDs will illuminate. It is not necessary to remove external power when this occurs. The unit will operate on external power and provide a continual “trickle” charge to the battery.

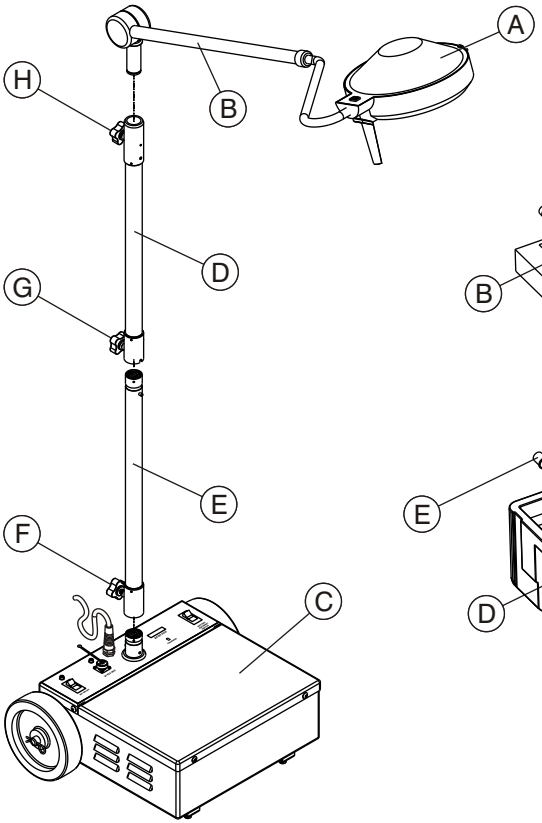
## E. Battery Disconnect Switch

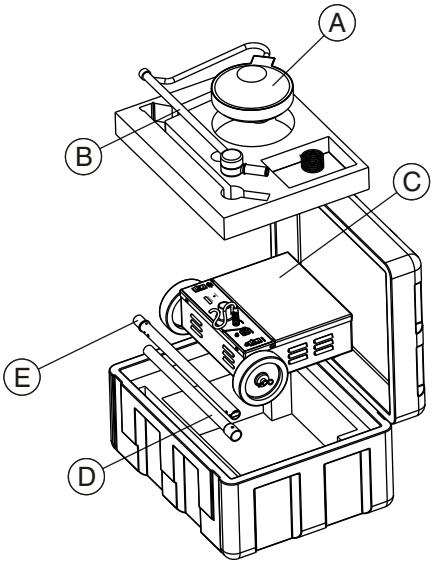
This switch will disconnect the internal battery from the electronics. It is recommended that this switch be placed in the OFF position when the light is not being used and there is no external power input provided. This will prevent any drain on the battery when not in use.



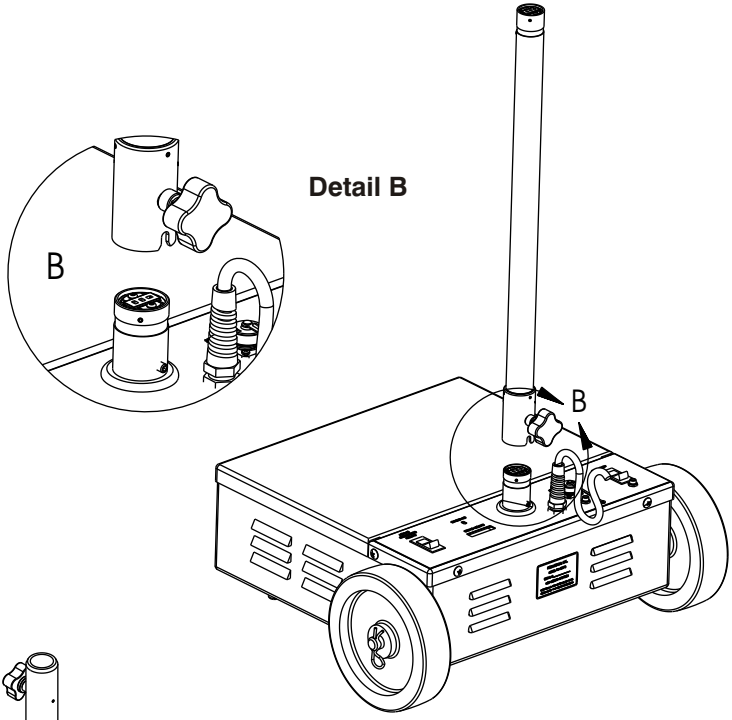
# 2. Unpacking and Setup

Remove the Lamp Head (A) and Spring Arm Assembly (B) from the top piece of foam packing (Detail A). Carefully insert the lamp head arm into the spring arm pipe until it stops. Slide the locking collar over the spring arm pipe and align the setscrew with the hole in the spring arm pipe. Tighten the setscrew. Remove top foam packing and set aside. Remove the Base Assembly (C), Lower Tube Assembly (E), and Upper Tube Assembly (D) from the bottom foam packing. Align the slot in the bottom end of the Lower Tube Assembly with the guide pin in the Base Assembly connector socket (Detail B, page 3). Slide the Lower Tube Assembly in until it hits a physical stop. Tighten the locking knob (F) on the Lower Tube Assembly clockwise to secure. Align the slot in the Upper Tube Assembly with the guide pin in the Lower Tube Assembly and slide together until it hits a physical stop(Detail C, page 3). Tighten the middle locking knob (G) clockwise to secure. Insert the Light Head Assembly (A/B) into the Upper Tube Assembly. Tighten the upper locking knob (H) until the desired level of swing tension is achieved. The FMI-301 FB surgical light is now ready for operation.

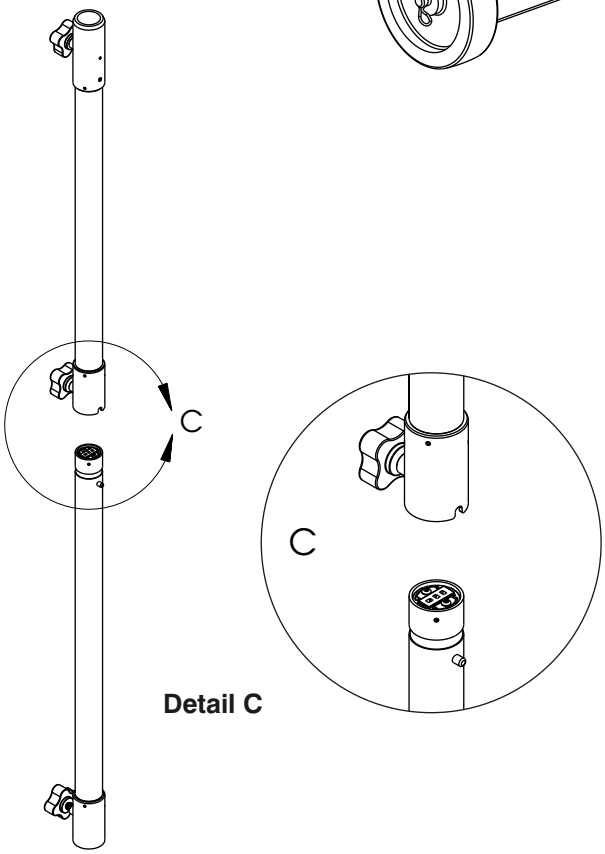



**Detail A**




**Detail B**




**Detail C**

# 3. Operating Instructions

The FMI-301FB will operate on any of three power sources, AC, 24VDC, or internal battery.

## A. AC OPERATION

The AC source can be 100 to 240VAC, 47 to 63 Hz. This unit is provided with a standard 115VAC plug on the AC power cord.

1. Turn the BATTERY DISCONNECT switch to the ON position.
2. Plug the AC cord into any standard wall outlet.
3. Turn the AC switch to the ON position. The LED over the AC switch should illuminate.
4. Turn the POWER switch on the lamp head to the ON position.

## B. DC OPERATION

The DC power can come from any 24VDC source capable of providing 350 watts of power. The 24VDC connector is compatible with the NATO SLAVE connector used in the HMMWV. The power cable provided has battery clips attached.

1. Turn the BATTERY DISCONNECT switch to the ON position.
2. Plug the selected DC source into the 24 VOLT INPUT. The LED over the 24 VOLT INPUT should illuminate.
3. Turn the POWER switch on the lamp head to the ON position.

## C. BATTERY OPERATION

1. Turn the BATTERY DISCONNECT switch to the ON position.
2. Turn the POWER switch on the lamp head to the ON position.

# 4. Disassembly for Repacking

Before disassembly, ensure that the POWER switch on the lamp head, the AC ON/OFF switch, and the BATTERY DISCONNECT switch are all in the OFF position.

1. Remove the Lamp Head Assembly by loosening the swing arm tension knob at the top of the Upper Tube Assembly and pulling the Lamp Head Assembly straight up.
2. Loosen the setscrew in the locking collar and carefully separate the Spring Arm Assembly from the Lamp Head.

**Use caution when disassembling the Spring Arm Assembly from the Lamp head Assembly. They are connected by approximately 3 inches of excess cable.**

3. Place the two assemblies in the top foam packing.
4. Remove the Upper Tube Assembly from the Lower Tube Assembly by turning the middle knob counter clockwise until it springs outward. Pull the Upper Tube Assembly straight up.
5. Remove the Lower Tube Assembly from the Base Assembly by turning the lower knob counter clockwise until it springs outward. Pull the Lower Tube Assembly straight up.
6. Place the two tube assemblies into the bottom foam packing.
7. Place the Base Assembly into the bottom foam packing.
8. Place the top foam packing with its parts into the case.
9. Close the lid and ensure that all the latches are secured.

## 5. Charging the Battery

To charge the battery, simply provide AC or DC power to the unit. Turn the BATTERY DISCONNECT switch to the ON position. If utilizing AC power, turn the AC ON/OFF switch to the ON position. The battery is now charging regardless of whether you are using the surgical lamp or not. Charging time will vary depending upon battery state, age, or whether or not you are using the surgical lamp. A typical charging cycle on a fully drained battery should take approximately 6 hours when the lamp is not in use.

## 6. Maintenance and Service

**Never perform maintenance or service on an energized unit. Ensure no external power is applied and the Battery Disconnect Switch is in the OFF position prior to opening the unit**

### A. Battery Replacement

The battery's performance and ability to hold a charge will degrade over time and eventually may need to be replaced. To replace the battery, remove the 2 screws on the front of the base and slide off the top cover. Remove the wires attached to the positive and negative battery terminals. Undo the velcro strap and carefully remove the thermistor harness and set aside. Remove the old battery and discard of properly. Install the new battery in the same orientation. Replace the velcro strap leaving it loosely secured. Place the thermistor harness under the velcro strap in the center of the battery then tighten the velcro strap. Securely fasten the appropriate wires to the positive and negative terminals. Reattach the top cover with the 2 screws.

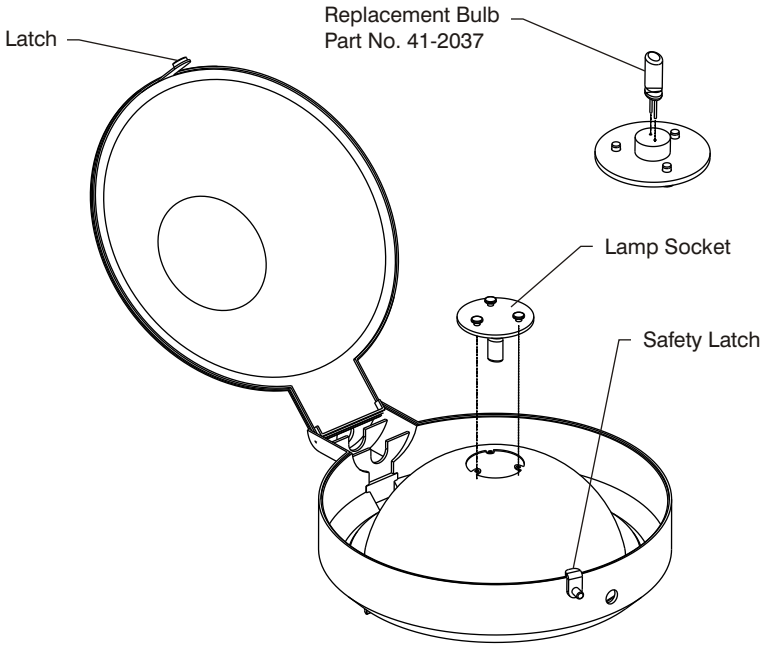
## B. Bulb Replacement

**Use caution when replacing the light bulb if the lamp was recently in use as the reflective dish and bulb may be hot.**

To replace the bulb, first pull the Safety Latch out and rotate 90 degrees. Depress the lid latch and raise the lid. Loosen the three knurled screws on the lamp socket and raise straight up.

**Do not touch the light bulb with your fingers. Always use a soft cloth or rag to prevent skin oils from getting on the bulb.**

Carefully remove the bulb from the socket and insert the new bulb. Place the lamp socket back in to the reflector dish and tighten the three knurled screws. Close the lid and rotate the safety latch to the secured position.




## C. Cleaning

As with all electronic equipment, periodic cleaning is recommended. Remove the 2 screws on the front of the base and remove the top cover. For best results, use a small electronic vacuum cleaner to remove dust and debris.

# 7. Troubleshooting and Repair

**Use extreme caution when troubleshooting energized circuits. Dangerous voltages are present which can be life threatening. Never attempt repairs on an energized circuit.**

**If the lamp does not light...**

- Verify that the bulb is good.
- Verify that a power source is present.
  - If operating on AC power:
    - Check to see if the fan on top of the 24VDC power supply is operating. If the fan is running, AC voltage is present. If the fan is not running, make sure the AC ON/OFF switch is in the ON position. If AC voltage is present to the unit, the LED above the AC ON/OFF switch will be illuminated.
    - Check the power supply's input and output. To verify the input, place the leads of an AC volt meter across the "ACL" and "ACC" terminals on one end of the power supply. The meter should read 115VAC. To verify the output, place the leads of a DC volt meter across either one of the "+24V" terminals and either one of the "GND" terminals. The meter should read approximately 24VDC.
  - If operating on an external DC source:
    - Verify the voltage by placing the leads of a DC volt meter across TB2-1(+) and TB2-2(-) of the circuit board. The meter should read approximately 24VDC.
  - If operating on the onboard battery:
    - Place the leads of a DC volt meter across the battery terminals. The voltage should read between 11VDC and 14VDC. If the voltage is below 11VDC, the battery should be charged.
- Check the charger board for proper operation.
  - Measure the battery voltage with a DC voltage meter and

note it. Apply an external AC or DC power source and re-measure the battery with the DC volt meter. The voltage on the meter should increase. This is the voltage going to the battery. This voltage will vary depending on the battery status. If the battery is sufficiently discharged, this voltage could climb to as high as 14.5 volts. Slightly higher or lower voltages are acceptable. The FMI-301FB is equipped with a “smart charger” which will access the battery status and provide the appropriate voltage. During the charge cycle, this voltage will gradually decrease until the battery is fully charged. At this time the charging circuit will continue to provide a trickle charge as long as an external power source is present. The FMI-301FB may be continually operated on an external power source without fear of overcharging the battery. The output of the charger board may be measured by connecting a DC volt meter across TB1-1(+) and TB1-2(-). The voltage present should be approximately the same as measured across the battery terminals. This voltage is also the input to the inverter which in turn provides 115VAC to the step down transformer. The transformer provides approximately 13VAC to the bulb.

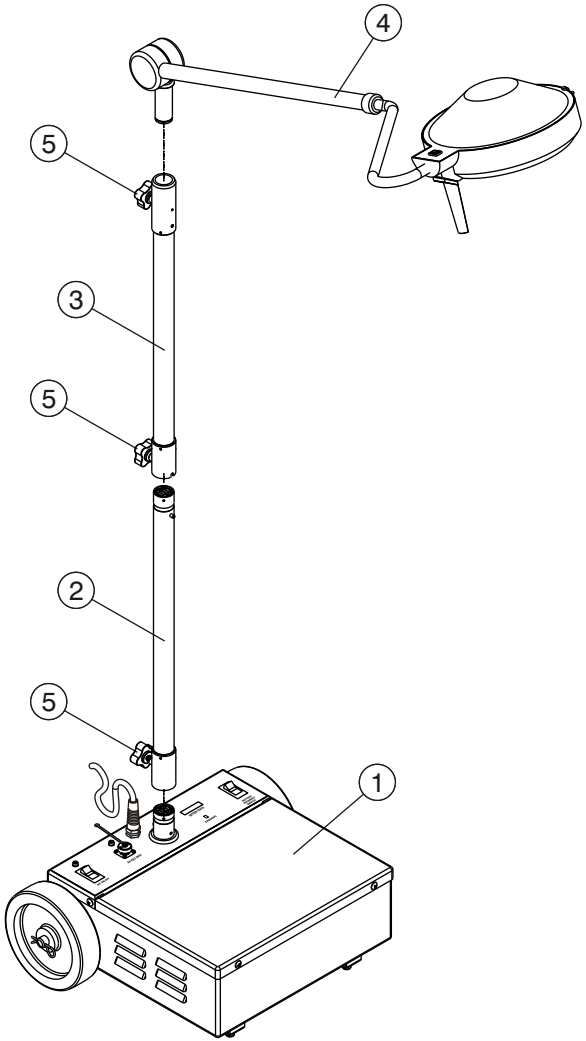
## 8. Storage

During long term storage of this product, ensure that the BATTERY DISCONNECT switch is in the OFF position.

## 9. Notes

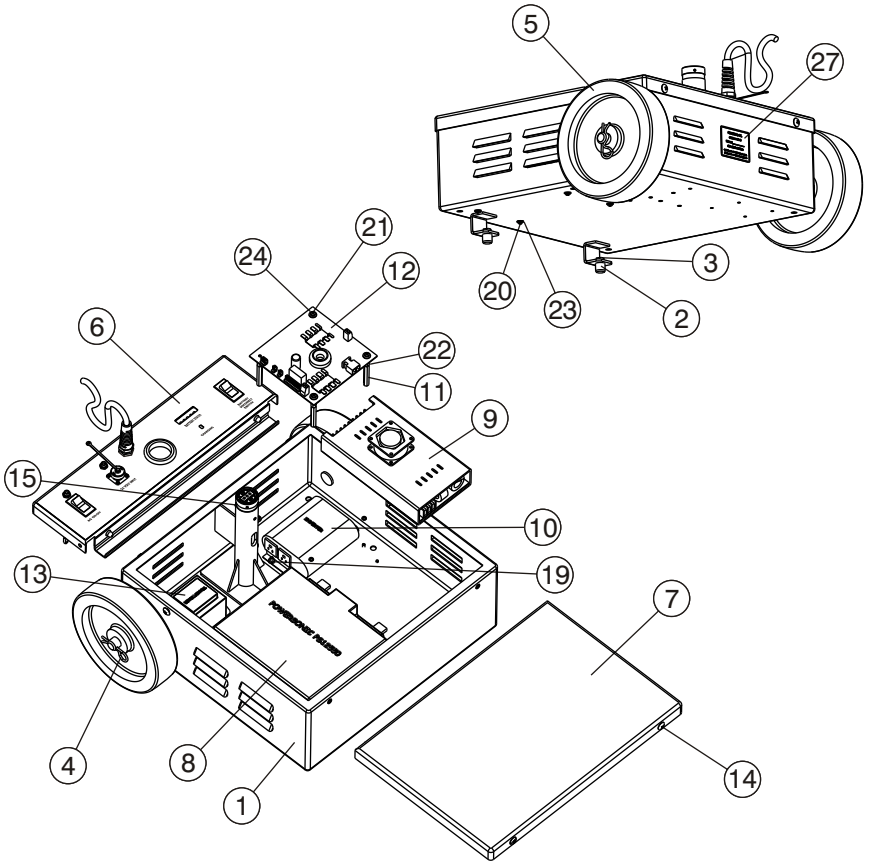
# 10. Parts List

## A. FMI-301FB



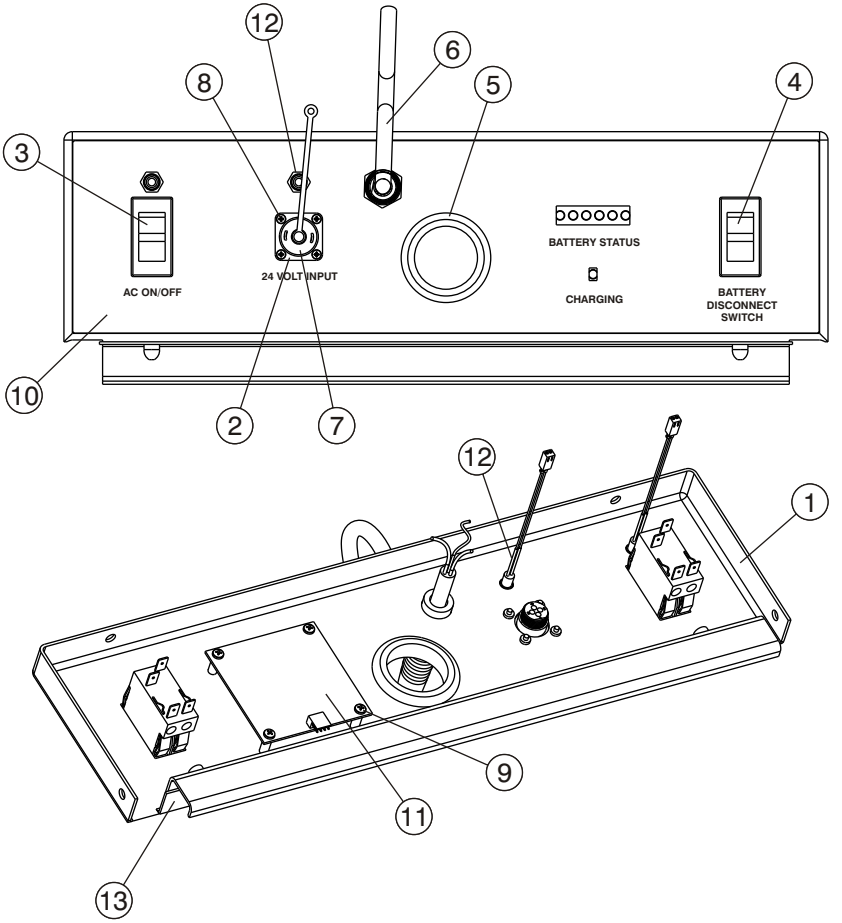

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 41-1004 | ASSEMBLY, BASE | 1 |
| 2 | 41-1095 | ASSEMBLY, LOWER TUBE | 2 |
| 3 | 41-1094 | ASSEMBLY, UPPER TUBE | 2 |
| 4 | 41-1072 | ASSEMBLY, LIGHT HEAD | 2 |
| 5 | 41-1099 | KNOB, FOUR LOBE | 3 |

## B. BASE ASSEMBLY




| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 41-1019 | BASE WELDMENT | 1 |
| 2 | 41-1023 | FOOT | 2 |
| 3 | HDW114 | HEX BOLT, 5/16-18 X .375” LG., ZP | 2 |
| 4 | 41-1043 | COTTER PIN | 2 |
| 5 | 41-1039 | WHEEL | 2 |
| 6 | 41-1025 | LID ASSEMBLY | 1 |
| 7 | 41-1014 | CHASIS LID, FRONT | 1 |
| 8 | 41-1002 | BATTERY, SEALED LEAD ACID | 1 |
| 9 | 41-1005 | POWER SUPPLY | 1 |
| 10 | 41-1006 | INVERTER,150 WATT | 1 |
| 11 | 41-1011 | STANDOFF, MALE/FEMALE, 8-32 X 2.0” LG. | 4 |
| 12 | 41-1008 | PCB, CHARGER | 1 |
| 13 | 41-1007 | TRANSFORMER | 1 |
| 14 | HDW115 | SCREW, 1/4-20 X .375”, TRUSSHEAD PHL. | 6 |
| 15 | HDW109 | 1/4-20 X 1.75” LONG, SS | 1 |
| 19 | HDW107 | ESN, #10-32, ZP | 4 |
| 20 | HDW003 | SCREW, PAN-HD PH, 6-32 X .375”, SS | 4 |
| 21 | HDW104 | SCREW, PAN-HD PH, 8-32 X .375”, SS | 6 |
| 22 | 41-1100 | STANDOFF, FEMALE/FEMALE, 8-32 X .875” LG. | 4 |
| 23 | HDW105 | FLAT WASHER, #6, ZINC PLATE | 4 |
| 24 | HDW017 | FLAT WASHER, #8 | 4 |
| 27 | 41-1077 | SERIAL NO. LABEL | 1 |

## D. CONTROL PANEL ASSEMBLY




| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 41-1024 | REAR LID ASSEMBLY | 1 |
| 2 | 41-1020 | BATTERY CONNECTOR | 1 |
| 3 | 41-1037 | CIRCUIT BREAKER, AC LINE | 1 |
| 4 | 41-1042 | CIRCUIT BREAKER, BATTERY DISCONNECT | 1 |
| 5 | 41-1038 | GROMMET | 1 |
| 6 | 41-1041 | ASSEMBLY, POWER CORD | 1 |
| 7 | 41-1045 | RECEPTACLE CAP | 1 |
| 8 | HDW002 | SCREW, PAN-HD PH, 4-40 X .375", SS | 4 |
| 9 | HDW003 | SCREW, PAN-HD PH, 6-32 X .375", SS | 4 |
| 10 | 41-1049 | LABEL | 1 |
| 11 | 41-1098 | PCB, CHARGE STATUS | 1 |
| 12 | 41-1052 | POWER INPUT INDICATOR HARNESS | 2 |
| 13 | 41-1016 | GASKET | 1 |

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